



PATENT  
STL11717

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

re application of: **Grant Edward Carlson and Karl Heinz Cunha**  
Assignee: **SEAGATE TECHNOLOGY LLC**  
Application No.: **10/817,311** Group No.: **2835**  
Filed: **April 2, 2004** Examiner: **Unknown**

For: **SHELF WITH REMOVABLE BACKPLANE**

**Mail Stop Petition**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**

**PETITION TO MAKE SPECIAL FOR NEW APPLICATION  
UNDER M.P.E.P. § 708.02, VIII**

**1. Petition**

Applicant hereby petitions to make this new application, which has not received any examination by the Examiner, special.

**2. Claims**

All the claims in this case are directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then applicant will make an election without traverse as a prerequisite to the grant of special status.

**3. Search**

A search has been made by an attorney and a professional searcher in the following:

Field of search: **Memory, Electrical and Storage**

Class/Subclass:

**360/98.01, 98.06**

**361/685, 724, 727, 788, 796,**

**797**

**711/114, 115**

Copies of the search result reports from Patents, Past and Present, and from Mark Spector, professional searchers, are submitted herewith.

**4. Copy of references**

All of the references most closely related to the subject matter are of record as filed with the Information Disclosure Statement, so no copies are submitted herewith, in accordance with M.P.E.P. 708.02VIII(D).

#272066

09/03/2004 WABDEIR1 00000043 10817311  
130.00 UP  
01 FC:1460

**5. Detailed discussion of the references**

There is submitted herewith a detailed discussion of the references, which discussion particularly points out how the claimed subject matter is distinguishable over the references.

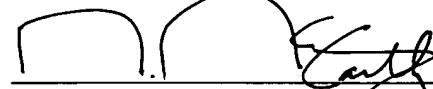
**6. Fee**

The fee required by 37 C.F.R. 1.17(h) is to be paid by:

Attached is a check in the amount of \$130.00.

Charge any additional fees required by this paper or credit any overpayment to Deposit Account No. 06-0540. A duplicate of this paper is attached.

Respectfully submitted,



Mitchell K. McCarthy, Registration No. 38,794  
Randall K. McCarthy, Registration No. 39,297  
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PATENT  
DKT. STL11717

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

O I P E JC169  
SEP 01 2004  
U. S. PATENT & TRADEMARK OFFICE  
In re application of: Grant Edward Carlson and Karl Heinz Cunha  
Assignee: SEAGATE TECHNOLOGY LLC  
Application No.: 10/817,311 Group No.: 2835  
Filed: April 2, 2004 Examiner: Unknown

For: SHELF WITH REMOVABLE BACKPLANE

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DETAILED DISCUSSION OF THE REFERENCES IN SUPPORT OF  
PETITION TO MAKE SPECIAL FOR NEW APPLICATION  
UNDER M.P.E.P. § 708.02, VIII

Sir:

The embodiments of the present invention as claimed by the independent claims are characterized, at least without limitation, by the following recited features:

Claims 1, 9

“a removable backend partition adapted for supporting a second component inserted in the backend, and a removable backplane support adapted for operably supporting a backplane in electrical connection with the first and second components.”

Claim 17

“removably inserting the backplane support in the backend opening; inserting a removable backend partition adapted for supporting a second component inserted in the backend....”

None of the references of record teach or suggest the manner and method of removably supporting the backplane and backend components according to the embodiments of the present invention.

Some previously attempted solutions involve a removable backplane support and backplane for electrically engaging components inserted in the frontend opening only. Gamble '692, for example, discloses a removable shuttle 304 supporting a substrate 312 to which a number of connectors 307 are attached for alignment with a desired number and size of data storage devices.

It will be noted that the shuttle 304 completes the chassis so as to preclude any occasion for a

backend opening. It will also be noted that removal of the shuttle 304 requires that it be moved in a direction transverse to the data storage devices in the frontend opening, thus requiring first electrically disconnecting the data storage devices from the connectors 307. In another example, Wenger '270 discloses a modular backplane 22 for similar use in a chassis with only a frontend opening for electrically connecting components. It will be noted the backplane 22 must similarly be rotated and moved out through the frontend opening, thus requiring first electrically disconnecting the data storage devices from the connectors 20. Similarly, Anderson '926 discloses a backplane 130 in a chassis with only a frontend opening, and which must be moved in a direction transverse to the data storage device connection for removal.

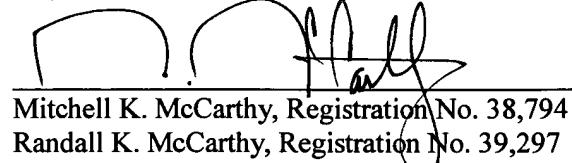
Some previously attempted solutions involve using a backplane in a midplane orientation, but do not disclose or suggest providing the backplane support as being removable through the backend opening. Young (WO 97/45784) discloses a front enclosure 12 and a rear enclosure 30 with the backplane 20 interposed therebetween. In this arrangement, the backplane 20 is not removably disposed within either enclosure 12, 30. Similarly, Driscoll '427 discloses the backplane 31 trapped between the fixed partitions defining the individual openings in the frontend and backend; "Backplane 31 is fixedly mounted within chassis 13 by means of a supporting bracket (not shown)." (col. 5, lines 21-23, emphasis added). In similar manner, Kuchta (WO99/60832) discloses a fixed stiffener 1103 sandwiched between cards 220, 221 and card 222.

Some previously attempted solutions do not disclose or suggest a removable backplane because they rely on electrically modifying the existing backplane rather than replacing it for different desired configurations. In Fujimura '490, for example, the number of desired channels is achieved by installing the respective number of terminal unit 104 and connector unit 103 pairs, or alternatively the respective number of bus connection units 701 in the backend opening. In Corrington '142, for example, removable internal SCSI bridges allow the desired number of channels to be configured.

None of the references of record disclose or suggest the novelty of the present invention as recited by the language of the independent claims. Accordingly, the references of record cannot sustain a Section 102 or 103 rejection.

It is submitted that all of the elements set forth in M.P.E.P. §708.02 subsection VIII have now been provided in this petition to make special. It is requested that this petition be granted and that the presented claims be examined as soon as possible.

Respectfully submitted,



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**PPP**

Express Mail Receipt No. EV466891961US  
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Dkt. No. STL11717

# Patents, Past & Present

## Patent & Trademark Research and Document Retrieval

Ms. Zeina Smith  
Sr. Legal Secretary  
Seagate Technology LLC  
Intellectual Property Department COL-2LGL  
389 Disc Drive  
Longmont CO 80503

September 18, 2003

Re: Patent Search: "Removable Backend Storage Shelf Partitioning with Attached Backplane"  
Your Reference: STL 11717      Our Reference: SEA469 COD

Dear Zee:

A patentability search directed to the above referenced, "Removable Backend Storage Shelf Partitioning with Attached Backplane", was conducted. The search was specifically directed to a rear inner module partitioning of a storage shelf comprising a sub-assembly partitioning/backplane assembled into shelf.

The Fields of Search, including published applications, were: US Class 361, subclasses 685, 724, 727, 788, 796, and 797. The USPTO computer database was also used for keyword and cross-reference searching.

The following U.S. patents were found:

20020131257	detachable partition extension	Agard, Kenneth K.
6496376	Modular backplane	Plunkett, John et al.
6351374	interface board #56, removable	Sherry, Raymond C.
6201692	removable backplane	Gamble, Eric Thomas et al.
5889650	sectional backplane #8, 8a, 8b	Bertilsson, Lars Yngve et al.
5828547	removable backplane	Francovich, Walter et al.
5604662	modular backplane	Anderson, Michael et al.
5325270	Modular removable backplane	Wenger, Gary T. et al.
4903170	backplane #17, Fig.3	Finney, Alwyn et al.
4454566	backplane #78, Fig.5	Coyne, James C.

If you have any questions or comments please feel free to contact me.

Kind regards,

Annie McKrill  
PATENTS, PAST & PRESENT



last line of this report is "end end"

From: Mark Spector 4452 South 36<sup>th</sup> ARL VA 22206 midmuzk@aol.com 703.3798824  
FOR: Mickey McCarthy<sup>Esq</sup> Fellers Snider, Bank One Bldg, 100 N. Broadway #1700  
Oklahoma City OK 73102 405.2320621 McCarthyIPLaw MMccarthy@fellerssnider.com

RE: MULTIPLE DISC ARRAY search

Dear Mr. McCarthy :

3.28.04

In response to your letter of 3.16, a search in the US Patent Office was conducted for a multiple disc array of stacked disc drives, removably installed in a shelved cabinet fixture with attached backplane, employing a partition having a plurality of openings to receive a portion of a data storage device, and employing a 1 to 1 correspondence between connectors such that the failure of any one connector only affects one data storage device.

I assume you're aware of US 5926366 Cunha, 5868261 Cunha, 5775418 Cunha and 20040056568 Carlson.

US Primary Patent Examiner D. Martin au2837, was consulted.

A search in US Patents was conducted in  
Memory, Class 711, Subclasses: 114 and 115  
Electrical, Class 361, Subclasses: 685, 727, 788  
Storage, Class 360, Subclasses: 98.01 and 98.06.

The following 23 US Patents and Pubs disclose multi disk and drive array configurations and connections.

6683793 Campbell : "Distributed Scalable Backplane"  
"A backplane is disclosed for attaching storage devices to the backplane that utilize removable media."

6651138 Lai : "Hot-plug memory cartridge power control logic"  
"a plurality of cartridge connectors coupled to the memory system board, each of the plurality of cartridge connectors configured to receive one of the plurality of memory cartridges and further configured to facilitate the insertion and removal of the memory cartridges while the system is powered-up"

6574687 Teachout : "Fibre Channel Data Storage System"  
"Electrical cabinet for storing a plurality of disk drives. The cabinet has an array of slots, each one of the slots being adapted to receive a corresponding one of a plurality of disk drives. Each one of the disk drive has a pair of ports."

6464509 Emberty : "Removable Storage Media in a Data Storage System"  
"A disk drive library has individual disk drives that are each provided with a combination mechanical and electrical connector for interfacing with a library backplane. Each connector has two components. The first component is mounted to the drive and has an electrical contact with a metallic burnished core of highly conductive material that is surrounded by an annular magnet. The mating component is on the backplane and is similarly formed with the opposite pole of a second magnet. When the two components are brought into close proximity, the two contacts attract each other to mate the contact cores, and thus establish an electrical connection. This connection is augmented by a spring mechanism to provide a solid, reliable connection."

6442022 Paul : "Removable Disc Drive Carrier"  
"A replaceable SCA drive adapter board detachably connected to the rear of a disc drive carrier"

6243790 Yorimitsu : "Re-arranging Logical Drives in a Disk Array"  
"A plurality of logical disks within one cabinet. The present invention provides a disk array apparatus in which logical disks can be easily re-arranged within the array, or added to the array."

6230217 Tuccio : "Host computer coupled to bank of disk drives"  
"The bank of disk drives has a plurality of sets of electrically connected disk drives, each one of the sets being connected to a corresponding one of the input/output interfaces of a corresponding one of the rear-end directors through the adapter card connected to such corresponding one of the rear-end directors and, through the printed circuit board, to the adapter card in the another one of the electrical connectors and to the input/output interface of the rear-end director in such other one of the electrical connectors."

6076142 Corrington : "User Configurable Raid System"  
"A user configurable RAID system designed to provide RAID functions as well as mass storage functions in a non-RAID mode. Flexibility is built into the system to allow the user to configure the SCSI bus to which removable drive modules are connected into one or more channels."

5974490 Fujimura : "Plural Disk Unit Apparatus"  
"A plurality of disk units capable of being removably inserted by plugging are directly mounted on the front side of the mother board through bus connectors, while connector units for external connection and having connectors of the control buses, terminal units having terminal circuits of the control buses, power units for supplying power to the disk units."

5913926 Anderson : "Expandable Modular Data Storage"

"A plurality of substantially identical, vertically stacked storage device housings adapted to slidably receive a data storage device, and mechanical connection elements for releasably connecting the top of one storage device housing to the bottom of a storage device housing stacked thereon. The array is connectable to a host computer."

5822184 Rabinovitz : "Modular Disk Drive Assembly"

"A modular data device assembly for a computer is disclosed, wherein the assembly has a housing that is designed to fit into a conventional, industry standard size expansion bay. Individual plug-in data storage devices such as hard disk drives or CD-ROM drives are disposed vertically in a stacked formation within the housing. A motherboard with plug-in connectors to which the drives are connected allows easy replacement of defective data devices, which devices slide in or out. The disk drives and modular data device assemblies may be arrayed in series or in parallel to a controller. By its modular structure and redundant storage functions, the present invention benefits from what is known as Redundant Array of Inexpensive Disk principle."

5752257 Ripoll : "Redundant array of removable cartridge disk drives"

"A memory system comprises an array of parallel removable hard disk cartridges"

5729763 Leshem : "Data storage system "

"Each disk interface includes a switch adapted to allow data to pass to another disk drive in the channel thereof; and, when the other channel becomes inoperative, coupling the disk drive in the inoperative channel to the operative fiber channel. With such arrangement, a disk drive may be removed without requiring a shut-down of the storage system (i.e., the disk drive may be "hot swapped")."

5652697 Le : "Computer System Backplane"

"The backplane is secured in the chassis without the use of screws. The fingers are defined within channels formed by a structure at the rear of a disk drive cage. The computer system further includes a plurality of disk drives mounted on trays which have rear pins that engage guide apertures formed in the backplane."

5517373 Hanson : "Disk Drive System w/Plural Removable Modules "

"A removable data storage system comprising: a plurality of self-contained portable disk drive modules."

5247427 Driscoll : "Disk Array Subsystem"

"A disk array subsystem adapted for use in a data processing system according to this invention comprises a chassis, a backplane fixedly mounted inside said chassis, disk drive module guide plate means, said disk drive module guide plate means including a first guide plate having a plurality of parallel slotted channels, said first guide plate being fixedly mounted inside said chassis, a plurality of disk drive modules slidably and removably mounted on said first guide plate, each disk drive module including an elongated T-bar slidably mounted in one of said parallel slotted channels, said disk drive module guide plate means serving to support said disk modules and to place the disk drive modules mounted thereon in approximate alignment with said backplane for electrical connection therewith, controller means for controlling the operations of said disk drive modules, and power supply means for powering said disk drive modules."

5124886 Golobay : "Drive Canister Module"

"A modular cabinet for enclosing a plurality of disk drive canisters."

4754397 Varaiya : "Fault Tolerant Modular Subsystems"

"The facility includes a housing array for containing a plurality of hardware element modules such as disk drives, a plurality of modularized power supplies and plural power distribution modules, each being connected to a separate source of primary facility power. Each module is self aligning and blind-mateable with the housing and may be installed and removed without tools, without disturbing the electrical cabling within the cabinet."

3725883 Bennett : "Modular Disk File Unit"

"a plurality of modular memory disk units in separate housings mounted in a single cabinet is described."

20040057203 Rabinovitz : "Modular Data Storage Device Assembly"

"A modular data device assembly includes a chassis that has an open front and a back. The chassis also has exterior dimensions that correspond to the dimensions of an industry standard drive bay. The chassis further has a plurality of slots that are disposed inside the chassis. The modular data device also includes a plurality of disk data storage devices, a backplane, and a connector. Each disk data storage device is disposed in one of the plurality of slots. The backplane is disposed in the back of the chassis. The backplane has a plurality of connectors which are mechanically coupled thereto and each of which is connected to one of the disk data storage devices. The power source connector is mechanically and electrically coupled to the backplane."

20030070043 Merkey : "High speed fault tolerant storage systems" Raid Network System "RNS is housed in an expansion cabinet mountable to a 19 inch rack by slide rails that permits up to eight of those RNS devices to be inserted into a chassis forming a single DASD assembly. Drive bays are accessible by sliding the unit out of the cabinet and adding or removing drives into empty drive bays in the unit. The cabinet assembly allows hot swappable drives to be added to the RNS expansion cabinet."

20030041201A1: Rauscher : "Raid system with multiple controllers" "A rack 700 is used to support the chassis of the RAID system. The rack 700 comprises the left vertical end 715, and right vertical end 705, which are connected by horizontal shelves 710, 720, 730, 740, 750, and 760. The storage array controller chassis 100 rests on shelf 710, and storage array controller chassis 200 rests on shelf 720. DASD chassis 300 rests on shelf 730, DASD chassis 400 rests on shelf 740, DASD chassis 500 rests on shelf 750, and DASD chassis 600 rests on shelf 760. "

20020144044 Moon : "Removable disk storage array" "Hot pluggable multi-drive magazine having a housing for holding a plurality of hard disk drives, each drive connected to receive power and data from the magazine in a controlled fashion, and at least one magazine receiving system for physically receiving the magazine and for thereupon providing power, data and control connections to the magazine, such that when the magazine is received within the magazine receiving system, the hard disk drives selectively receive power and data connections via the magazine and receiving system from a host computer. The magazine may be hot-disconnected from an active computing system."

A search in the US PTO EP (Euro) and JP (Japan) databases uncovered the following 3 references.

WO9960832A1: ELECTRONIC CIRCUIT CARD ASSEMBLY  
Inventor: KUCHTA, Douglas, Allan; LAPREE, Scott, Raymond; SEVERSON, Paul, Steven; THOMFORD, Paul, Jon;

Mark Spector  
MULTIPLE DISC ARRAY

3.28.04

Assignee: INTERNATIONAL BUSINESS MACHINES CORPORATION, New Orchard Road, Armonk, NY 10504, United States of America

Published / Filed: 1999-11-25 / 1999-03-02

Application Number: WO1999US0004873

IPC Code: H05K 5/00; H05K 7/02; H05K 7/10; H05K 7/14; H02J 3/06; H02J 7/00; H02J 7/02; H02J 9/00;

Priority Number: 1998-05-21 US1998000082897

Abstract: An electronic system contains a backplane circuit card assembly for distribution of electrical signals to one or more modules. The card assembly includes a plurality of pluggably connected base cards (220, 221), which provide redundant function. Preferably, two base cards (220, 221) in a single plane are connected by a single smaller parallel offset jumper card (222), the cards being coupled by pluggable connectors (301, 302, 401, 402, 501-504). The system preferably includes redundant power supply modules (201, 202) and redundant functional modules (203-216), which plug into the backplane from both sides. The modules connected to any one of the base cards provide minimum system functionality in the absence of the other card and its modules. Due to the redundant function, it is not only possible to replace any module, but is possible to replace a base card itself, while the system remains operational. The exemplary embodiment is an intelligent redundant array of independent disks (RAID) storage server having concurrent maintenance capability.

Attorney, Agent or Firm: TRUELSON, Roy, W. ;

WO9745784A3: ENCLOSURE FOR REMOVABLE COMPUTER PERIPHERAL EQUIPMENT

Inventor: YOUNG, JAMES, PATRICK; CLEVENGER, DONALD; LEE;

Assignee: CMD TECHNOLOGY INC. United States of America

Published / Filed: 1998-01-15 / 1997-05-13

Application Number: WO1997WO0008100

IPC Code: G06F 1/16;

Priority Number: 1996-05-31 US1996000656032

Abstract: An enclosure system for receiving a number of plug in computer peripheral devices, such as hard disk drives in a disk array, utilizes front and rear cages or enclosures (12, 30) that are separated by a vertical backplane (20) having internal circuit interconnections and multi-pin docking connectors (22, 24) on each face. A front bezel (44) provides access to the backplane (20) through the front cage enclosure (19), so that trays containing the drives (71) can be inserted and plugged into the connectors (29). The vertical spacing is arranged to be modifiable, so that different numbers of higher profile and lower profile devices can be used.

Mark Spector  
MULTIPLE DISC ARRAY

3.28.04

EP1026688A3: Removable integrated multiple internal disk drive subsystem

Inventor: Churchill, Robert J.; Hopla, Steven D.; Reyes, Jose G.; Hannigan

Assignee: Siemens Information and Communication Networks Inc.

Published / Filed: 2001-06-13 / 2000-01-31

Application Number: EP2000000300730

IPC Code: G11B 33/12;

Priority Number: 1999-02-02 US1999000243151

**Abstract:** A computer system and a method of servicing the system utilize a disk drive array assembly (12) that can be internally installed into and removed from a host electronic casing (10) of the system as a single unit. The disk drive array assembly is an integrated single unit, housing a number of hard disk drives (18, 20, 22, 24 and 26). The disk drive array assembly can support a redundant inexpensive, or independent, disks (RAID) system. The disk drive array assembly is comprised of a disk cage (46), a backplane (16) and the hard disk drives. The disk cage and the backplane form an integrated housing unit (14 and 16) for the hard disk drives. The disk cage includes a number of tracks (50a, 50b, 52a, 52b, 54a, 54b, 56a, 56b, 58a and 58b), located on two lateral interior surfaces of the disk cage. Each track on one surface of the disk cage is laterally aligned to a track on the other surface. A pair of aligned tracks is designed to guide a single hard disk drive that is being inserted into the disk cage. In addition, the same pair of aligned tracks provides support for the disk drive after being inserted into the disk cage. The unitary design of the disk drive array assembly allows the disk drive array assembly to be transferred from one computer system to another computer system in an intact condition. Furthermore, the unitary design provides easy access to other electronic devices contained within the host electronic casing, since the disk drive arrays assembly can be removed from the host electronic casing in the same intact condition.

Attorney, Agent or Firm: Mohun, Stephen John ;

In the time allotted, I've selected here what struck me as most relevant from several thousand multi disk array patents, but as in any patent search, this one could be continued and extended. I repeatedly went through this disclosure of over 75 pages of text and figures and this is my most relevant collection of multi drive arrays, cabinets and connections. ~14hrs@30, email, no copy.

TOTAL: \$ 430

Thank-You Mr. McCarthy

four hundred thirty

page seven of eight